Remarks

Entry of the amendments, reconsideration of the application, as amended, and allowance of all pending claims are respectfully requested. Claims 1-49 are pending.

With the above amendments to claims 1, 3, 5, 7, 12, 17, 28, 29, 35, 36, 42 and 43, applicants are clarifying that the state of the prospective member is state that is specific and individual to that member, as opposed to group state that defines the group. Support for this amendment can be found throughout the specification (e.g., pp. 16-19 and FIGs. 9a-9b), and thus, no new matter is added. Further, applicants have amended claims 22, 24 and 26 to clarify that a sequence number is being updated. Support for this amendment can be found throughout the specification (e.g., p. 21 and FIG. 15), and thus, no new matter is added.

Dependent claim 49 is added to more particularly define the sequence number. Support for this amendment can be found throughout the specification (e.g., pp. 14-15; pp. 18-20), and thus, no new matter is added.

In the Office Action, dated September 5, 2003, claims 1-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Moiin (U.S. Patent No. 6,108,699). Applicants respectfully, but most strenuously, traverse this rejection for the reasons herein.

Applicants' invention is directed, in one aspect, to a protocol used to join a prospective member to a processing group. The join protocol includes various steps taken to ensure configuration consistency. These steps include, for instance, the comparison and updating of state to appropriately join the prospective member to the group. One example of the state used in applicants' protocol is individual prospective member state (i.e., state specific to the prospective member). In one instance, this state is a sequence number of the prospective member that is used throughout the join protocol to control whether a prospective member joins the group and to ensure configuration consistency.

As one particular example, applicants claim a method of managing processing groups of a distributed computing environment (e.g., independent claim 1). The method includes, for instance, comparing at least a portion of an individual prospective member state of a prospective member of a processing group with at least a portion of a group state of the processing group, the

individual prospective member state comprising state defined for the individual prospective member and excluding state defined for the processing group; updating the at least a portion of the individual prospective member state, should the comparing indicate a difference; and joining the prospective member to the processing group, in response to the updating. Thus, in applicants' claimed invention, the individual prospective member state is employed in the joining. This individual prospective member state helps ensure the consistency of the configuration. The use of the individual prospective member state in the joining process is very different from the teachings of Moiin.

While Moiin describes a join protocol, the join protocol of Moiin is distinct from the protocol of applicants' claimed invention. For instance, the join protocol of Moiin fails to employ an individual prospective member state, as claimed by applicants. Instead, Moiin only uses group state. That is, the comparisons and updating in Moiin are of group state. There is no teaching or suggestion of comparing and/or updating individual member state, as claimed by applicants.

To further explain, FIG. 4 and Cols. 5-7 of Moiin describe that the join process of Moiin includes broadcasting reconfiguration messages to nodes 1-5; waiting to receive replies to those reconfiguration messages; and eventually updating various group states, including a next cluster size field, a next cluster vector, a cluster size field and a cluster vector. Each of the states that is compared and updated defines the group. For instance, the cluster vector field describes all of the nodes of the cluster, and the cluster size field describes the size of the cluster. None of those fields includes state defined for the individual member, as claimed by applicants. The only individual state described in Moiin is the identification field, and this field is not compared or updated.

The comparing and updating of group state is described throughout Moiin. For instance, it is explicitly stated in Col. 6, lines 13-17:

> In step 408, CMM 220A (FIG. 3) updates next cluster size field
> 308 and next cluster vector 310 to represent a cluster which
> includes node 0 and all nodes from which CMM 220A receives a
> reconfiguration message in step 406 (FIG. 4).

It further states in Col. 6, lines 35-42:

Specifically, in test step 410 (FIG. 4), CMM 220A (FIG. 3) compares the cluster size represented in cluster size field 304 to a value of one to determine whether any node other than node 0 is a member of the prospective cluster. If the cluster size is greater than one, processing transfers to step 414 (FIG. 4) which is described below. Conversely, if the cluster size is not greater than one, processing transfers to test step 412.

Yet further, Col. 7, lines 44-60 state:

In test step 422, CMM 220A (FIG. 3) compares the received reconfiguration messages to determine whether all the received reconfiguration messages represent exactly the same cluster, i.e., whether all received reconfiguration messages agree as to cluster membership in the prospective cluster. If any of the received reconfiguration messages do not agree as to cluster membership, processing transfers from test step 422 (FIG. 4) to step 420 in which the reconfiguration of the cluster fails in the manner described above. Conversely, if all received reconfiguration messages agree as to membership in the prospective, processing transfers from test step 422 to step 424. In step 424, the prospective cluster is accepted and node 0 saves the prospective cluster as the current cluster by copying data from next cluster size field 308 (FIG. 3) and next cluster vector field 310 to cluster size field 304 and cluster vector field 306, respectively.

Thus, it is repeatedly stated in Moiin that the comparisons and updates are of group state, i.e., state that defines the group, rather than of individualized state of the prospective member. Again, the only individualized state described in Moiin is identification field 302 (FIG. 3), which is described in Col. 5, lines 33-35. Moiin states: "This identification field includes data which uniquely identifies node 0 and distinguishes node 0 from nodes 1-5 (FIG. 1)." Thus, while Moiin describes an identifier field, there is no description, teaching or suggestion of a comparison of the identifier field with the group state. Further, there is certainly no teaching or suggestion of updating the identifier field. Therefore, there is no description, teaching or suggestion in Moiin of comparing at least a portion of an individual prospective member state of a prospective member with the at least a portion of the group state, in which the individual prospective member state comprises state defined for the individual prospective member and excludes state defined for the processing group; nor is there any description, teaching or suggestion of updating the individual prospective member state. Thus, applicants respectfully submit that Moiin does not anticipate independent claim 1, as well as independent claims 3 and

5. Further, for similar reasons, applicants respectfully submit that Moiin does not anticipate independent claims 28, 35 and 42.

The dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features. For example, dependent claim 7 specifically indicates that the individual prospective member state comprises a sequence number of the prospective member, and the comparing compares the sequence number of the prospective member with a sequence number of the processing group. Applicants respectfully submit that there is no teaching or suggestion in Moiin of a sequence number. As understood, a sequence is defined, for instance, as a continuity of progression (see, e.g., Webster's Ninth New Collegiate Dictionary). Applicants use the sequence number to identify, for instance, the particular version of the group configuration. Applicants respectfully submit that there is no teaching or suggestion of a sequence number in Moiin.

Support for the rejection of claim 7 is indicated at Col. 5, lines 24-26 and 32-46 and Col. 6, lines 13-17. However, a careful reading of those sections fails to describe a sequence number. Instead, various fields are described without reference to sequence. For instance, an identification field is described which uniquely describes the node. This identification field, however, is not described as having a particular sequence or of being a sequence number. Further, this field is neither compared nor updated. Additionally, a cluster vector field and a cluster vector size are described. These fields describe the members of the cluster and the size of the cluster. They do not describe a sequence number of the prospective member or of the group. Based on the foregoing, applicants respectfully submit that dependent claim 7, and other similarly rejected claims, are not anticipated by Moiin.

Further, newly added dependent claim 49 specifically states that the sequence number of the prospective member identifies a version of a proposed processing group to join. There is no description, teaching or suggestion in Moiin of a sequence number identifying a version of a processing group. Thus, claim 49 is not anticipated, taught or suggested by Moiin, and applicants respectfully request an indication of allowability for dependent claim 49.

Another aspect of applicants' invention is directed to handling failed members. As one example, applicants claim a method of managing processing groups of a distributed computing

environment (e.g., in independent claim 22), in which the method includes detecting a failure of at least one member of a processing group; quiescing activity to a group state of the processing group; and updating at least a portion of the group state in order to exclude the at least one member of the processing group. The updating includes updating a sequence number of the group state, the sequence number identifying a version of the processing group. Thus, in this aspect of applicants' claimed invention, when a failure of a member of a processing group is detected, the processing group is updated in order to exclude that member. The updating includes updating the sequence number that identifies a version of the processing group. This is very different from the teachings of Moiin.

There is no description, teaching or suggestion in Moiin of updating a sequence number that identifies the version of the processing group in order to exclude a member from the group. Instead, Moiin uses a procedure in which a node that is leaving the cluster or has failed does not respond to a reconfiguration message (see, e.g., Col. 10), and thus, a new group is formed that excludes the non-responding node. When the new group is formed, its size is inserted in the cluster size field, and the members of the cluster are included in the next cluster vector field. There is no description at all in Moiin of identifying versions of the processing group and updating a version to exclude a member. Thus, Moiin does not anticipate applicants' invention, as claimed in independent claim 22, as well as in independent claims 26 and 28.

Further, the dependent claims are patentable for the same reasons as the independent claims, as well as for their own individual features.

For all of the above reasons, applicants respectfully request an indication of allowability for all pending claims.

Should the Examiner wish to discuss this case with applicants' attorney, please contact applicants' attorney at the below listed number.

Respectfully submitted,

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